

BIRDS OF THE COCOS (KEELING) ISLANDS, INDIAN OCEAN

By D. HOPTON
P.O. Box 56, Ashbourne, South Australia 5157

SUMMARY

This paper reports on bird observations made on two trips to the Cocos (Keeling) Islands including the remote and difficult-to-access Pulu Keeling National Park in May and June/July 2003. Although additional species new to the island that I recorded as well as some of my other sightings have been included in Johnstone and Storr (2004), this paper expands on my observations during my time on the islands. I have included a list of all previous species sighted on the islands although a review of all previous records can be found in Johnstone and Storr (2004).

INTRODUCTION

The Cocos (Keeling) Islands are situated in the north-eastern Indian Ocean (12° 12' S, 96° 54' E). The closest island is Christmas Island (see Figure 211 in Johnstone and Storr 2004), which is 975km to the east-north-east. Java Head is just over 1,000 km to the northeast while Perth is 2900km to the southeast (Parks Australia 1999). The annual climate is tropical with an average rainfall of 1976 mm. The islands have an average daily maximum of 28.9 C, high humidity and a predominant wind direction of east to south-east with average daily speeds of 16 to 30 km/hr for most of the year (Director of National Parks 2004).

The southern atoll consists of 26 islands surrounding a lagoon. North Keeling Island (only 1.2 square kilometres in size) is 24 km to the north. The total land area of the two atolls is 14 square kilometres. A narrow submarine bank at a depth of 700–800m connects the atolls while the depth of the surrounding ocean is approximately 5000m. There is no fresh water on North Keeling Island. Bechet Besar freshwater swamp on West Island is the only fresh water above ground on the islands, although Horsburgh Island has a small brackish lake on its northern side. The islanders rely on the freshwater lenses on the two largest islands, West Island and Home Island, for water.

There are about five hundred Cocos-Malay people living on Home Island and one hundred people, mostly public servants, live on West Island (Parks Australia 1999). The islands are very low lying, the highest point being on South Island where a sand dune reaches 9m above sea level.

Even before settlement in the early nineteenth century Coconuts (*Cocos nucifera*) were abundant on the islands. However, since then coconut plantations have replaced most of the original vegetation on the southern atoll. The vegetation on North Keeling Island remains pristine due mainly to its inaccessibility (Parks Australia 1999).

North Keeling Island was proclaimed Pulu Keeling National Park in 1995 and is Australia's smallest Commonwealth national park. The island is 2km long and 1.3km wide. The shore rises steeply to a height of 3–5 m and then slopes gradually to the central lagoon. The Park includes the land area of the island as well as a marine area extending 1.5km around the perimeter. As well as the Park's value as an unspoiled coral atoll ecosystem it supports one of the largest breeding colonies in the world of the Red-footed Booby (*Sula sula*) (Parks Australia 1999). The mouth of the lagoon on the east coast has been blocked for the last few years and the water level in the lagoon is falling.

Pisonia (*Pisonia grandis*) forest and

Coconut dominate the vegetation on North Keeling Island. Octopus Bush (*Argusia argentea*) shrublands are common on the eastern shore while Tea Shrub (*Pemphis acidula*) and smaller patches of Ironwood (*Cordia subcordata*) form dense thickets around the margin of the lagoon, interspersed with open grassy areas (Parks Australia 1999).

The vegetation is affected by cyclones that pass through the area occasionally. The shallow rooted *Pisonia* trees are easily blown over and reshoot where they fall. Cyclone Walter, which passed through the area on 5 April 2001, felled 14 percent of the trees on North Keeling and destroyed 61 percent of the canopy (Director of National Parks 2004). The resulting regrowth and original root systems and old trunks form formidable barriers as well as ideal habitat for the endemic Cocos Buff-banded Rail (*Gallirallus philippensis andrewsi*).

Apart from birds a few other vertebrates occur on the Cocos (Keeling) Islands.

The Mourning Gecko (*Lepidodactylus lugubris*) occurs on North Keeling Island while on the southern atoll the introduced House Gecko (*Hemidactylus frenatus*) and a blind snake (*Ramphotyphlops* sp.) also occur (Director of National Parks 2004). Green Turtles (*Chelonia mydas*) and Hawksbill Turtles (*Eretmochelys imbricata*) are common, the Green Turtle

nesting on the northern atoll (Director of National Parks 2004). A Dugong (*Dugong dugon*) has been resident in the lagoon since May 2002 (Director of National Parks 2004). Rabbits were introduced to the islands some time ago and there are still occasional reports of sightings by locals on Direction Island (W. Murray pers. comm.).

Gibson-Hill (1949) cited an "immense number" of marine birds on the main atoll in 1828–29 and stated that Charles Darwin, visiting the area in April 1836, referred to the trees on the main atoll as being "occupied by many nests of seabirds".

Most of the birds had been eliminated from the southern atoll by 1885 because of habitat change, density of human habitation, intense hunting pressure and predation by cats and rats. Today there are still very few birds on the southern atoll (Stokes 1982).

Carter (1994) recorded approximately sixty species of birds from the islands, however, the number was increased to 72 species (Johnstone & Storr 2004). The inclusion of the Northern Giant Petrel recorded by Park staff in 2003 (Murray, pers. comm) now increases the number to 73.

METHODS

My bird observations were made over two separate periods, 4–15

May 2003 and 26 June–14 July 2003. During the first period I searched the entire outer perimeter of the southern atoll and a small portion of the inner lagoon area as well as accessible areas within the islands. During the second period I was employed by Parks Australia to undertake a bird survey of Pulu Keeling National Park. I visited the National Park twice, in the company of park staff, from 30 June 2 July and from 7–10 July. The trip from the southern atoll to Pulu Keeling takes one hour by boat. There is only one landing place on the island, reached by a 50m swim.

On both trips the island and the lagoon were circumnavigated. Approximately 5 hours was also spent searching the forested areas, mainly using set transect lines, which are used for Red-footed Booby counts. The lagoon area was also thoroughly investigated.

The Wedge-tailed Shearwater nesting area was checked three times in the evenings with the intent of determining the presence of the Herald Petrel (*Pterodroma arminjoniana*), which was observed in this area once before. The area was observed for a period of one hour on each occasion until fading light made bird identification impossible. The taxonomy and nomenclature of this list generally follows Christidis and Boles (1994).

BIRD SPECIES OF THE COCOS (KEELING) ISLANDS

Green Junglefowl *Gallus varius*

The former owner of the Cocos Keeling Islands, George Clunies-Ross, introduced these birds to the southern atoll, probably around 1800 (Gibson-Hill 1950). I found these birds common along the roads and the runway on West Island. Some were observed with one to three chicks. On one occasion 42 individuals were counted from the northern end of the runway.

Green Junglefowl are decreasing in number in their own home range in Indonesia due to habitat loss and capture for the pet trade but as an introduced species on West Island appear to be doing well. While considered a pest by locals in gardens and farms this population could become an important gene pool for the species. This species does not occur in Pulu Keeling National Park.

Red Junglefowl *Gallus gallus*

Chickens derived from this species are kept by many of the islanders and many escape their cages or are deliberately let loose around the pondoks (local shacks). I noticed the occasional bird around dwellings and also along the road on West Island as well as on Home, South and Horsburgh Islands.

The domestic chicken is capable of interbreeding with the Green Junglefowl and in some countries is deliberately crossed

to breed birds for cock fighting. I saw no obvious evidence of crossbreeds occurring on the islands although given the number of both feral chickens and Green Junglefowl seen this would seem to be likely to occur.

Feral chickens are restricted to the southern atoll and are not found in Pulu Keeling National Park.

Helmeted Guineafowl *Numida meleagris*

Stokes *et al.* (1984) stated that a pair had been seen in the transmitter area on West Island for a number of years probably derived from domestic stock from the Clunies-Ross estate. These birds have not been seen recently.

Hardhead *Aythya australis*

I observed one adult male in the brackish lake on Horsburgh Island on 11 May 2003. This was the first record for the Cocos (Keeling) Islands. The bird was not sighted on my second visit.

Northern Giant-Petrel *Macronectes halli*

A Northern Giant Petrel was found on Home Island and handed to park staff in May/June 2003 in an emaciated condition. It died but unfortunately the bird was not kept as a specimen (Murray, pers. comm.).

Herald Petrel *Pterodroma arminjoniana*

Approximately ten birds were

seen on North Keeling around the Wedge-tailed Shearwater colony, possibly breeding, from April to June in 1986 (Stokes and Goh 1987). No petrels were sighted during my visit despite checking the area on three evenings. Previous attempts at sighting this species by park staff have also been unsuccessful. Visits to the island are limited and as this species can only be sighted at dusk and observers are few there may be a possibility that this species still visits the island.

Wedge-tailed Shearwater *Puffinus pacificus*

I observed these birds entering burrows in the early evenings in the area adjacent to the inlet on Pulu Keeling National Park. The fact that they were still present in July when breeding should be well completed was interesting. Previous records indicate breeding occurs between October and November (Gibson-Hill 1950) (Carter 1994) and possibly up to January (Stokes *et al.* 1984). Four birds were seen to circle, land and enter burrows one evening and on subsequent evenings two and then one bird were observed. About 20 active or recently used burrows were in the area. A few breeding birds have also been recorded from West Island (Johnstone and Storr 2004).

Yellow-nosed Albatross *Diomedea chlororhynchos*

One bird was found in an emaciated condition, 2 July 1941

(Gibson-Hill 1949). This specimen was later identified as *D. c. bassii* (Johnstone and Storr 2004).

Red-tailed Tropicbird *Phaethon rubricauda*

Breeding birds have been recorded on South Island, West Island and on North Keeling Island (previous records summarised by Johnstone and Storr 2004).

White-tailed Tropicbird *Phaethon lepturus*

I observed up to 14 birds at a time in Pulu Keeling National Park usually high above the other birds and always late in the day. One bird was observed possibly leaving a nesting hollow in an ironwood and others were observed flying among trees in the centre of the forest. I also observed one individual at Trannies Beach on West Island. Small numbers have been recorded on West Island (Johnstone and Storr 2004).

Masked Booby *Sula dactylatra*

This species breeds throughout the year in Pulu Keeling National Park but winter is the prime nesting time. Birds are only occasionally recorded from the southern atoll (Johnstone and Storr 2004). During my visit I observed approximately 50 pairs nesting on the coast on south-eastern Pulu Keeling National Park and two birds were observed nesting in the open grassy area near the inlet. Most nests contained eggs although

there was one large chick at the inlet near the Wedge-tailed Shearwater nesting area.

Red-footed Booby *Sula sula*

In 1941, 3,500–4,000 pairs were estimated to be present (Gibson-Hill 1950), 30 000 individuals were recorded in 1982 (Stokes *et al.* 1994) and 'tens of thousands' breeding birds were sighted in 1999 (Johnstone and Storr 2004). The resident population of this species on the northern atoll is now estimated by park staff to number 30 000 pairs (Director of National Parks 2004). The population of Red-footed Booby appears to have grown under protection.

On both my visits to Pulu Keeling National Park, the birds I observed nesting were mainly in the lagoon area and *Pisonia* trees in the centre of the island but many were also nesting over other areas of the island, even in low bushes. Some birds were collecting nesting material while others had eggs or chicks up to approximately eight weeks old. Dark plumaged immature birds were also common. Many birds were nesting close to the frigatebirds. I also observed a few birds out to sea from Home Island.

Brown Booby *Sula leucogaster*

Evidently this species fluctuates widely in numbers (Johnstone and Storr 2004) but during my visit approximately 20 pairs were nesting along the coast in Pulu Keeling National Park. Nests were at various stages, eggs to large

chicks being present. Birds are occasionally sighted near the southern atoll.

Little Pied Cormorant *Phalacrocorax melanoleucos*

I observed one bird at the northern end of the runway, West Island on 7 May 2003. This was the first sighting for the islands of this species.

Little Black Cormorant *Phalacrocorax sulcirostris*

Four birds were observed on the edge of the lagoon on the southern end of the runway on 29 June 2003. This was another first record for the island.

Great Frigatebird *Fregata minor*

During my visits to Pulu Keeling National Park, a number of small pockets of nesting birds were observed between the Lesser Frigatebirds and many birds were roosting in the trees on the eastern side of the lagoon. Only eggs were observed. Although I made no estimation of numbers they were noticeably less common than the Lesser Frigatebird. At the time of my visit the Lesser Frigatebirds outnumbered Greater Frigatebirds by about ten to one. This was considerably less than Carter's (1994) estimation in 1994 of two to one. Breeding is confined to the northern atoll although birds are occasionally sighted around the southern atoll (Johnstone and Storr 2004).

Lesser Frigatebird *Fregata ariel*

Estimations in 1999 by park staff

from surveys indicate a resident population of approximately 3000 pairs (Parks Australia 1999). In November 1999 J. Reid estimated 10000 birds on the island (Johnstone and Storr 2004). I found these birds were very abundant in Pulu Keeling National Park; nests were located in loose groups mainly around the lagoon area in tea shrub or ironwood and most contained eggs. Some birds were also observed off the coast on the southern atoll.

Christmas Frigatebird *Fregata andrewsi*

An adult female was recorded from North Keeling in 1986 (Stokes and Goh 1987) and two more birds were seen on North Keeling in 1993 (Carter 1994). I observed three adult female birds near South Island flying with Lesser Frigatebirds on my first visit.

White-faced Heron *Egretta novaehollandiae*

One bird was recorded in January 1992 (Stokes *et al.* 1982).

Little Egret *Egretta garzetta*

A specimen taken in 1879 from West Island was identified as the Indonesian race *nigripes* (Forbes 1885). Carter (1994) observed a bird with yellow feet on West Island on 4 November 1993. J. Reid recorded two birds in November 1999 with nuchal plumes and bare part colouring consistent with the subspecies *nigripes* (Johnstone and Storr 2004).

I observed Little Egrets opposite the meteorological station on the edge of the lagoon, in the North Park area and on the oval on Home Island. Up to four birds were observed at a time and all were longer legged and more upright and slender than the Eastern Reef Egrets. They had blackish bills grading to greenish/yellow at the base. Those that I observed closely had dark legs with yellow feet. There is a possibility that these birds may be the subspecies *E. garzetta garzetta*. The Australian subspecies *E. g. nigripes* has black feet with yellow to grey soles while the subspecies *garzetta*, which occurs in Europe, Asia, Japan, Philippines and Africa, has yellow feet (Marchant and Higgins 1990). A specimen would be needed for confirmation of subspecies.

Eastern Reef Egret *Egretta sacra*

Reef egrets are reported to breed on the southern atoll in coconut trees around January (Gibson-Hill 1949, Stokes *et al.* 1994). I encountered these birds often on the rocky shore, inland lagoon and grassy areas on West Island as well as most of the smaller islands. They were often in the company of the Little Egrets. Mainly white morphs were seen. Few were seen on Pulu Keeling National Park probably due to lack of suitable habitat.

On 5 July 2003 I observed a light ash grey bird in the company of two dark phase birds and four white phase birds in the swampy

area around the towers just south of North Park. This particular bird had a pale coloured bill, white head and neck, pale ash grey body and wings, darker towards the primaries. The legs were darkish. On 11 July 2003 a light ash grey bird in company of one dark phase and five white phase birds was observed on the lagoon side of central South Island. This bird appeared similar to the bird seen on West Island. I am fairly confident that this was an Eastern Reef Egret but have never before heard of this colour variation.

Great Egret *Ardea alba*

On 6 July 2003 I flushed three birds from Beshet Besar freshwater swamp. The yellow bills, dark legs (trailing in flight), long kinked neck and large size of these birds, compared to the two reef herons also in the swamp, clearly identified these birds. The birds were seen again on 13 July 2003. This was a new record for the islands.

Cattle Egret *Ardea ibis*

Two birds were observed in breeding plumage on 14 January 1982 (Stokes *et al.* 1982).

Black-crowned Night Heron *Nycticorax nycticorax*

One specimen was taken on 13 October 1941 (Gibson-Hill 1950).

Nankeen Night Heron *Nycticorax caledonicus*

Observed nesting on the islands

as early as 1879 but regarded as a visitor in 1949 (Forbes 1885, Gibson-Hill 1949). I found these birds common on West Island especially in open grassy areas. They are also commonly seen on lawns around buildings. On 29 June 2003 I observed 34 birds from the northern end of the runway. They nest in the Pemphis shrubs on the small offshore islands of the southern atoll (Murray, pers. comm.). Three birds were also observed roosting in Pulu Keeling National Park amongst nesting frigatebirds and Red-footed Boobies and four birds were seen on Home Island.

Glossy Ibis *Plegadis falcinellus*

Four birds were recorded on the airstrip in May 1990 (Stokes 1994). J. Reid recorded three birds at Bechet Besar swamp on 18 November 1999 (Johnstone and Storr 2004).

On 6 May 2003 I observed seven birds on the northern end of the runway. Probably the same birds were present in various places including Bechet Besar freshwater swamp on my second visit.

Greater Flamingo *Phoenicopterus ruber*

One bird was seen on North Keeling during 26 April to 15 June 1988 (Marchant and Higgins 1990).

Swamp Harrier *Circus approximans*

One specimen was taken on 6 July 1941 (Gibson-Hill 1950).

Nankeen Kestrel *Falco cenchroides*

A pair was seen for several weeks on West Island on 5 June 1990 (Stokes 1994).

Buff-banded Rail *Gallirallus philippensis*

This endemic subspecies *G. philippensis andrewsi* was once common on all islands in the group but now is almost confined to Pulu Keeling National Park where it is said to have been introduced in the late 1800s, although it may already have been present (Gibson-Hill 1948). It appears that a small population may be surviving on West Island as an adult with five chicks was seen at the southern end of the runway in July 2002 (Director of National Parks 2004).

On my visit to Pulu Keeling National Park I found these birds very common along the edge of the lagoon with up to 20–30 individuals within sight simultaneously. They were also encountered frequently in the forested area. Fewer were encountered around the coast. One chick, only a few days old, was observed in the large grassy area opposite the inlet in the central lagoon region. Four half-grown chicks were also present in the same area.

White-breasted Waterhen
Amaurornis phoenicurus

Local rangers have previously recorded this species on the islands and have seen adults with chicks (Murray, pers. comm.). The

species has been on the islands at least since 1998 when a specimen was hit by a plane on the runway and eventually identified in May 2000 by J. Reid (Johnstone and Storr 2004). I observed single birds on West Island at the northern end of runway, in a swampy area on the lagoon side of West Island, as well as near the Quarantine Station and just south of North Park.

Pin-tailed Snipe *Gallinago stenura*

This species is considered an uncommon visitor (Johnstone and Storr 2004).

Little Curlew *Numenius minutus*

One bird seen near the airstrip on West Island on 12 and 15 March 1983 and three birds on 26 March 1983 (Stokes *et al.* 1984).

Whimbrel *Numenius phaeopus*

Recorded as an uncommon visitor from both atolls (Johnstone and Storr 2004). Park staff regularly see this species on the coastal side of South Island, however, during my visit no birds were seen there on 9 May 2003, the birds probably having migrated north.

Common Redshank *Tringa totanus*
Johnstone and Storr (2004) considers this species to be a rare visitor.

Common Greenshank *Tringa nebularia*

This species is considered an uncommon visitor (Johnstone and Storr 2004).

Common Sandpiper *Actitis hypoleucos*

This species is considered a regular visitor (Johnstone and Storr 2004).

Ruddy Turnstone *Arenaria interpres*

Ruddy Turnstones are regular visitors to the islands (Johnstone and Storr 2004). Up to 12 birds in breeding or part breeding plumage were observed by me in the central lagoon area near inlet on Pulu Keeling National Park and on the rocky eastern shore near the inlet on both visits.

Sanderling *Calidris alba*

This species is considered an irregular visitor (Johnstone and Storr 2004).

Sharp-tailed Sandpiper *Calidris acuminata*

One bird seen on West Island on 4 November 1993 (Carter 1994).

Curlew Sandpiper *Calidris ferruginea*

J. Reid observed a single bird on the shore of Pulu Keeling National Park on 9 November 1999 (Johnstone & Storr 2004).

Black-winged Stilt *Himantopus himantopus*

E. Alfred recorded a bird of the nominate subspecies from Afro-Eurasia at Bechet Besar swamp on 28 November 1958 (Johnstone and Storr 2004). On 14 May 2003 I observed one bird at the southern end of runway in a shallow salt-water pond. The

black nape was clearly visible identifying it as the Australian subspecies *leucocephalus*. Possibly the same bird was observed several times at the northern end of the runway on my second visit.

Pacific Golden Plover *Pluvialis fulva*

This species is considered an irregular visitor (Johnstone and Storr 2004).

Grey Plover *Pluvialis squatarola*

One was seen on the airstrip on 4 November 1993 (Carter 1994).

Greater Sand Plover *Charadrius leschenaultii*

This species is considered a regular visitor (Johnstone and Storr 2004).

Oriental Plover *Charadrius veredus*

One bird was seen on 17 October 1941 (Gibson-Hill 1950).

Oriental Pratincole *Glareola maldivarum*

This species is considered a regular visitor (Johnstone and Storr 2004). Park staff have noted their annual visits in the late dry season each year (Director of National Parks 2004).

Lesser Black-backed Gull *Larus fuscus*

A bird was banded as a chick at Simo, Lapland, Finland on 13 July 1957 and recovered freshly dead, presumably killed by islanders, on South Island at the end of September 1959 (Johnstone and Storr 2004).

Common Tern *Sterna hirundo*

One of two birds present was collected from the lagoon area on the main atoll on 11 February 1941 (Gibson-Hill 1950).

Bridled Tern *Sterna anaethetus*

One was collected from North Keeling on 5 July 1941 (Gibson-Hill 1950).

Sooty Tern *Sterna fuscata*

The variation in nesting dates in this species is interesting. In January 1983 30–40 nests with eggs were recorded (Stokes *et al.* 1984). Carter (1994) saw no evidence of breeding in November 1993. However, in November 1999 120–150 pairs with mainly 2–3 week old chicks were recorded, while nests with eggs were also present (Johnstone and Storr 2004). Gibson-Hill (1950) recorded the nesting season here to be in November or early December in 1940, although he suggested that this species might follow a nine to ten month rotation instead of twelve. During my visit approximately 200–300 birds roosted in the southeastern corner of the lagoon in Pulu Keeling National Park. At least two nests contained eggs. Birds are also occasionally recorded from the waters around the southern atoll (Johnstone and Storr 2004).

White-winged Black Tern

Chlidonias leucopterus

Considered an irregular visitor (Johnstone and Storr 2004).

Common Noddy *Anous stolidus*

I observed this numerous species nesting in a variety of situations on Pulu Keeling National Park including on the beach, amongst old coral in the central lagoon area as well as in trees. Nests in the lagoon area contained eggs and one chick was present on coral shingle on the coastal edge of island. On the second visit I observed eight birds nesting in coconut trees near the south end of West Island. Gibson-Hill (1950) stated that this species lays its eggs from late December to early March on the islands and suggested the difference in nesting times to other islands near the same latitude may be associated with changes in ocean currents.

White Tern *Gygis alba*

I observed approximately ten birds at Trannies Beach on West Island. One half grown chick was observed in *Calophyllum inophyllum* on the broken end of an upright branch, during the first visit. A newly hatched chick was present in July. These birds were abundant in Pulu Keeling National Park. Nests can be found over most of the island but generally away from other nesting seabirds. A number of birds were incubating eggs while a couple of newly hatched chicks were also observed.

Small numbers were nesting on Home Island, and a few were sighted on South and Horsburgh Islands.

Lesser Noddy *Anous tenuirostris*

A report of up to 40 pairs of this species breeding in Pulu Keeling National Park in November 1999, is detailed in Johnstone and Storr (2004).

Christmas Island Imperial Pigeon
Ducula whartoni

Introduced between 1890–95. Now considered extinct (Johnstone and Storr 2004).

Buffy Fish-Owl *Ketupa ketupa*

One collected 23 October 1941 (Gibson-Hill 1950).

Fork-tailed Swift *Apus pacificus*

On 11 May 2003 I observed two birds flying over and around the brackish lake on Horsburgh Island. This was the first record for these islands.

Rainbow Bee-eater *Merops ornatus*

I heard and observed one bird flying overhead at the northern end of the runway on 29 June 2003. This bird, which appeared to be a juvenile, was closely observed in the tower area just south of North Park on 12 and 13 July 2003. This was the first record for the islands.

Dollarbird *Eurystomus orientalis*

There are two reports of single birds from the islands (Johnstone and Storr 2004).

Yellow Wagtail *Motacilla flava*
simillima

J. Reid observed a first year bird on Horsburgh Island swamp on

15 November 1999 and another bird on North Keeling Island on 23 November 1999 (Johnstone and Storr 2004). There are also unconfirmed reports such as a wagtail with yellowish underparts observed on Home Island in December 1981 (Stokes *et al.* 1984).

On 9 May 2003 I sighted one bird along a shallow creek at northern end of runway. This bird was observed for about ten minutes and as close as 4m. It was olive green above and yellow below (including underneath throat). The crown was also olive green. It had a very prominent white eyebrow and white edging to tail and black eye-stripe. The wing feathers had lighter edging but not prominent. The bird was flushed several times to reveal the olive green rump. It was identified as a Yellow Wagtail in the field using MacKinnon and Phillips (1995). Using various other references I have since identified this bird as being a male of the subspecies *simillima* using my field notes. The very prominent white eyebrow and yellow throat were the main identifying features. The fact that this bird did not exhibit the bluish-slate crown typical of a breeding male of this subspecies may indicate a change to non-breeding plumage.

Grey Wagtail *Motacilla cinerea*

These birds have been sighted by park staff in August and September in most years since 1996 (Director of National Parks 2004).

Double-barred Finch *Taeniopygia bichenovii*

Originally thought to be aviary escapes this species is now considered extinct on the islands (Johnstone and Storr 2004).

Asian Golden Weaver *Ploceus hypoxanthus*

This species was also probably introduced around 1800 but is now considered extinct (Johnstone and Storr 2004).

Java Sparrow *Padda oryzivora*

The former owner of the Cocos Keeling Islands, George Clunies-Ross, introduced this species around 1800. It is now considered extinct (Johnstone and Storr 2004).

Barn Swallow *Hirundo rustica*

I observed three birds during my second visit. Two were seen near the runway and one was observed in the lagoon area opposite the inlet in Pulu Keeling National Park. This species is considered a regular visitor and local rangers have often seen the species on Home Island.

Christmas Island White-eye
Zosterops natalis

George Clunies-Ross introduced these birds to Horsburgh Island between 1885 and 1900 (Stokes *et al.* 1984). They are now reasonably common on this one island. I observed approximately 25 individuals mainly in the ironwood growing around the small lagoon.

Island Thrush *Turdus poliocephalus erythropleurus*

The former owner of the Cocos Keeling Islands, George Clunies-Ross, introduced this species around 1800. It is now considered extinct (Johnstone and Storr 2004).

UNCONFIRMED SPECIES

Duck species

Wood-Jones (1909) and Forbes (1885) both refer to a flock of ducks resident on West Island but did not identify them.

Western Reef Heron *Egretta gularis*
I observed an unusual bird on 27 June 2003 in the swampy region around the towers, on the northern end of West Island (just south of North Park). This all white bird had the two distinct breeding plumes on the nape present although the darkish bill had a distinct yellow/orange tinge at the base. The legs did not appear very dark but more grey/green and the yellow colouring on the feet extended part way up the tarsus. The description and photographs were shown to John Darnell of the Western Australian Museum who suggested the possibility of the Western Reef Heron *Egretta gularis*. The description in Brown *et al.* (1982) of the white morph of *E. gularis dimorpha* comes very close to what I saw with "yellow feet with yellow extending part way up the tarsus" and "bill

black, similar to that of Little Egret *E. garzetta*, but some yellow at base". It also states that the bill is longer, heavier and down curved at tip, not straight and slender like *garzetta*. On careful scrutiny of the photographs that I managed to take, the bill does appear longer and heavier than expected for *E. garzetta* but they were not clear enough to be absolutely certain. In my mind it does appear to be likely to be this species. I am not confident enough, however, with my description to be certain.

During his visit to the islands Julian Reid also saw a bird closely matching the above description but without the breeding plumes. The bird recorded on November 1999 on Pulu Blan had "bright yellow bill, dark long legs with yellow feet (noted in flight) facial skin greenish and had a longer neck than attendant Reef and Little Egrets" (Johnstone and Storr 2004).

From these observations I would suggest that the egrets on Cocos (Keeling) Islands require further investigation. The procurement of specimens would be the best way to verify species/subspecies.

Hawk species

A small unidentified hawk was seen on 29 May 1983 (Stokes *et al.* 1982).

Dove species

A possible dove species was seen on Horsburgh Island in November 1982 (Stokes *et al.* 1982).

Common Koel *Eudynamis scolopacea*

A bird recorded by J. Reid on West Island on 14 November 1999 has been identified as this species (Johnstone and Storr 2004).

Nightjar species

One unidentified bird seen on the airstrip on 26 March 1983 (Stokes *et al.* 1982).

Edible-nest Swiftlet *Collocalia fuciphaga*

On 13 May 2003 I observed one bird flying around the quarantine station and adjacent coconut palms. This bird was observed for approximately ten minutes with some good views. It was very much smaller than the fork-tailed swifts, which were observed only two days previously. Plumage was dark brown all over with a paler brown rump. Tail shallowly forked. Using a field guide (MacKinnon and Phillips 1995) on site this bird was identified from the Black-nest Swiftlet and Mossy-nest Swiftlet by the pale rump and shallowly forked tail. These birds are notoriously difficult to identify in the field, however, and not being familiar with this species I am not one hundred percent certain of this identification. If confirmed this would be another first for the islands.

White-throated Needletail *Hirundapus caudacutus*

Twenty to thirty birds believed to be this species seen over

Bechet Besar Lagoon on West Island on 14 January 1982 and two unidentified swifts seen near West Island in June 1982 (Stokes *et al.* 1982).

Arctic Warbler *Phylloscopus borealis*

A small brown passerine was observed closely by a local at North Park shortly before my second visit. On being queried and shown a field guide, an Arctic Warbler was singled out as the most likely species. Park staff were unable to relocate the bird and unfortunately the species was not verified.

DISCUSSION

Of the confirmed 73 species of birds recorded on the Cocos (Keeling) Islands only 20 have been recorded as breeding while 43 are recorded as vagrants or irregular visitors. Of the 9 introduced species 6 are listed as extinct on the islands (refer to Table 1).

The small colony of Common Noddies at the southern end of West Island and the small White Tern colonies at Trannies Beach and Home Island are an encouraging sign that bird numbers may increase with protection. However, poaching is an ongoing problem on both atolls. Even the northern atoll's remoteness and difficult access does not deter poachers.

The rangers of Pulu Keeling National Park face the unenviable task of trying to

manage a National Park 24km away by sea. Access is difficult, the weather fickle and legislation inadequate. The number of shotgun shells encountered on the Southern Atoll during my visit was also an indication of what the rangers are up against. During my first visit an immature Lesser Frigatebird was handed in to park staff with a shattered wing joint apparently caused by a shotgun pellet. I was told by park staff that even the diminutive White Tern is not safe from the poachers gun. A shooting hide was discovered on my last trip to Horsburgh Island, adjacent to the lagoon. There were many shotgun shells in the area. This hide was not there on the previous visit and was immediately dismantled by park staff.

The lagoon habitat encountered in both Pulu Keeling National Park and the southern atoll appears to be ideal for many species of migratory wader, however only Ruddy Turnstones were encountered. Migratory wader numbers would be expected to be higher around November to February when these birds are more prevalent in the Southern Hemisphere.

Vagrant seabirds and migratory waders would be expected from these islands, possibly blown off course by the strong south-east trade winds or cyclones. The chances, however, of any small vagrant species reaching such a remote set of islands are still slim

Table 1. List of birds recorded on Cocos (Keeling) Islands. Br = breeding recorded, R = resident, S = regular visitor, I = irregular visitor, V = vagrant, * = introduced, E = considered extinct.

Common Name	Scientific Name	Status	North Keeling	Southern Atoll	Observed by author
Green Junglefowl	<i>Gallus varius</i>	* R		Br	+
Red Junglefowl	<i>Gallus gallus</i>	* R		Br	+
Guinea Fowl	<i>Numida meleagris</i>	* E		+	+
Hardhead	<i>Aythya australis</i>	V		+	
Northern Giant Petrel	<i>Macronectes halli</i>	V		+	
Herald Petrel	<i>Pterodroma arminjoniana</i>	I	Br		
Wedge-tailed Shearwater	<i>Puffinus pacificus</i>	S	Br	Br	+
Yellow-nosed Albatross	<i>Diomedea chlorohynchos</i>	V		+	
Red-tailed Tropicbird	<i>Phaethon rubricauda</i>	I	Br	Br	+
White-tailed Tropicbird	<i>Phaethon lepturus</i>	S	Br	Br	+
Masked Booby	<i>Sula dactylatra</i>	R	Br	+	+
Red-footed Booby	<i>Sula sula</i>	R	Br	+	+
Brown Booby	<i>Sula leucogaster</i>	R	Br	+	+
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	V		+	+
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	V		+	+
Great Frigatebird	<i>Fregata minor</i>	R	Br	+	+
Lesser Frigatebird	<i>Fregata ariel</i>	R	Br	+	+
Christmas Frigatebird	<i>Fregata andrewsi</i>	V	+	+	+
White-faced Heron	<i>Egretta novaehollandiae</i>	V		+	+
Little Egret	<i>Egretta garzetta</i>	I		+	+
Eastern Reef Egret	<i>Egretta sacra</i>	R		Br	+
Western Reef Egret	<i>Ardea gularis</i>	V		+	+
Great Egret	<i>Ardea alba</i>	V		+	+
Cattle Egret	<i>Ardea ibis</i>	V		+	+
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	V		+	+
Rufous Night Heron	<i>Nycticorax caledonicus</i>	R		Br	+
Glossy Ibis	<i>Plegadis falcinellus</i>	I	+	+	+

Table 1 (cont.)

Common Name	Scientific Name	Status	North Keeling	Southern Atoll	Observed by author
Greater Flamingo	<i>Phoenicopterus ruber</i>	V	+		
Swamp Harrier	<i>Circus approximans</i>	V		+	
Nankeen Kestrel	<i>Falco cenchroides</i>	V		+	
Cocos Buff-banded Rail	<i>Gallirallus philippensis andrewsi</i>	R	Br	Br	+
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	R		Br	+
Pin-tailed Snipe	<i>Gallinago stenura</i>	I		+	
Little Curlew	<i>Numenius minutus</i>	V		+	
Whimbrel	<i>Numenius phaeopus</i>	S	+	+	
Common Redshank	<i>Tringa totanus</i>	I		+	
Common Greenshank	<i>Tringa nebularia</i>	I		+	
Common Sandpiper	<i>Actitis hypoleucos</i>	S	+	+	
Ruddy Turnstone	<i>Arenaria interpres</i>	S	+	+	+
Sanderling	<i>Calidris alba</i>	I	+	+	
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	V		+	
Curlew Sandpiper	<i>Calidris ferruginea</i>	V	+		
Black-winged Stilt	<i>Himantopus himantopus</i>	V		+	+
Pacific Golden Plover	<i>Pluvialis fulva</i>	I		+	
Grey Plover	<i>Pluvialis squatarola</i>	V		+	
Greater Sand Plover	<i>Charadrius leschenaultii</i>	I	+	+	
Oriental Plover	<i>Charadrius veredus</i>	V		+	
Oriental Pratincole	<i>Glareola maldivarum</i>	S		+	
Lesser Black-backed Gull	<i>Larus fuscus</i>	V		+	
Common Tern	<i>Sterna hirundo</i>	V		+	
Bridled Tern	<i>Sterna anaethetus</i>	V	+		
Sooty Tern	<i>Sterna fuscata</i>	S	Br	+	+
White-winged Black Tern	<i>Chlidonias leucopterus</i>	S	+	+	
Common Brown Noddy	<i>Anous stolidus</i>	R	Br	Br	+
Lesser Noddy	<i>Anous tenuirostris</i>	V	Br		

White Tern	<i>Gygis alba</i>	R	Br	+
Christmas Island Imperial Pigeon	<i>Ducula whartoni</i>	*E	+	
Common Koel	<i>Eudynamys scolopacea</i>	V	+	
Buffy Fish-Owl	<i>Ketupa ketupa</i>	V	+	
Nightjar sp		V	+	
Swiftlet sp		V	+	
White-throated Needletail	<i>Hirundapus caudacutus</i>	V	+	
Fork-tailed Swift	<i>Apus pacificus</i>	V	+	
Rainbow Bee-eater	<i>Merops ornatus</i>	V	+	
Dollarbird	<i>Eurystomus orientalis</i>	V	+	
Yellow Wagtail	<i>Motacilla flava similima</i>	I	+	
Grey Wagtail	<i>Motacilla cinerea</i>	S	+	
Double-barrd Finch	<i>Taeniopygia bichenovii</i>	*E	+	
Asian Golden Weaver	<i>Ploceus hypoxanthus</i>	*E	+	
Java Sparrow	<i>Padda oryzivora</i>	*E	+	
Barn Swallow	<i>Hirundo rustica</i>	S	+	
Christmas Island White-eye	<i>Zosterops natalis</i>	*R	Br	+
Christmas Island Thrush	<i>Turdus poliocephalus erythropleurus</i>	*E	+	

and the habitat may not be suitable for many species. The prospects of these displaced species are probably bleak. The Yellow-nosed Albatross and Northern Giant Petrel for example arrived at the islands in extremely poor condition. However, before 1941 the Rufous Night Heron was considered a vagrant but is now a common resident. The White-breasted Waterhen, a recent colonist of the islands appears to be breeding there and increasing in numbers.

Another factor to consider, however, may be the large number of frigatebirds around the northern atoll. While on Christmas Island I witnessed several frigatebirds attack and kill a smaller bird (identity unknown due to distance out to sea). Frigatebird aggressive tendencies are well known and it is likely that any small vagrant species would quickly be eliminated if it chanced to reach Pulu Keeling National Park. This may explain why all small vagrant birds have been recorded only from the southern atoll where these aggressive species do not occur. The lack of observers on the northern atoll, however, makes this difficult to determine.

The breeding of seabirds on North Keeling Island appeared to be in variance with dates indicated by other authors. Breeding patterns vary from locality to locality and the latitude would have some bearing on breeding times. The

local weather patterns such as the onset of the monsoons would probably be the final determining factor in the breeding times on these islands.

While birdwatchers visiting the southern atoll may not be overrun by a choice of birds the possibility of finding something new and unusual on these beautiful and unique islands makes birding the Cocos (Keeling) Islands an enjoyable challenge.

ACKNOWLEDGEMENTS

I would like to thank Parks Australia for providing me with the valuable opportunity to visit Pulu Keeling National Park and undertake the bird survey. Special thanks to Wendy Murray, Government Conservator, and Ismail Macrae, Project Officer who escorted me on my trips to Pulu Keeling National Park. Their help and guidance whilst in Cocos (Keeling) Islands during both visits proved invaluable.

Thanks also to Wendy Murray, Tony Robinson, Ian Hopton, Ron Johnstone, John Darnell, Andrew Ley and John Dell in the preparation of this paper.

REFERENCES

- BROWN, L.H., URBAN, E.K. and NEWMAN, K. 1982. *The Birds of Africa*, vol 1 Academic Press Inc. London.
- CARTER, M.J. 1994. Birds of the Cocos-Keeling Islands. *Wingspan* 15: 14-18.

- CHRISTIDIS, L and BOLES, W.E. 1994. *The Taxonomy and Species of Birds of Australia and its Territories*. RAOU Monograph 2, Royal Australasian Ornithologists Union, Melbourne.
- DIRECTOR OF NATIONAL PARKS. 2004. *Pulu Keeling National Park Management Plan*. Director of National Parks.
- FORBES, H.O. 1885. *A Naturalist's Wanderings in the Eastern Archipelago*. London.
- GIBSON-HILL, C.A. 1948. The Island of North Keeling. *J. Malay Br. Roy. Asiat. Soc.* 21: 88-103.
- GIBSON-HILL, C.A. 1949. The Birds of the Cocos-Keeling Islands. *Ibis* 91: 221-243.
- GIBSON-HILL, C.A. 1950. Papers on the Fauna of the Cocos-Keeling Islands. *Bulletin of the Raffles Museum* 22: 211-270.
- JONSTONE, R.E. and STORR, G.M. 2004. Appendix B Annotated Checklist of Birds from Cocos-Keeling Islands. pp 477-496 In: *The Handbook of Western Australian Birds Vol. 2. Passerines: Blue-winged Pitta to Goldfinch*. Western Australian Museum, Perth.
- MACKINNON, J. and PHILLIPS. K.1995. *A Field Guide to The Birds of Borneo Sumatra, Java and Bali*. Oxford University Press Inc, New York.
- MARCHANT, S. and HIGGENS, P.J. (Editors). 1990. *Handbook of Australian, New Zealand and Antarctic Birds*, Vol. 1. Oxford University Press: Melbourne.
- PARKS AUSTRALIA 1999. *Pulu Keeling National Park Plan of Management*. Parks Australia.
- REID, J.R.W. 2000. *Survey of the Buff-banded Rail (Rallus philippensis andrewsi) in Pulu Keeling National Park, Cocos Islands, Indian Ocean*. Report to Parks Australia North.
- STOKES, T. 1982. *Birds of the Cocos (Keeling) Islands, Indian Ocean*. Australian National Parks Service Internal Report.
- STOKES, T. 1994. *An Update on Birds of the Cocos (Keeling) Islands*. In: *Ecology and Geomorphology of the Cocos (Keeling) Islands*, (Ed C.D. Woodroffe). Atoll Research Bulletin Nos 399-414. National Museum of Natural History, Smithsonian Institution : Washington.
- STOKES, T., SHEILS, W. and DUNN, K. 1984. Birds of the Cocos (Keeling) Islands, Indian Ocean. *Emu* 84: 23-28.
- STOKES, T. and GOH, P. 1987. Records of Herald Petrels and the Christmas Island Frigatebird from North Keeling Island, Indian Ocean. *The Australian Bird Watcher* 12: 132-133.
- WOOD-JONES, F. 1909. *Fauna of the Cocos-Keeling Atoll*. Proc. Zool. Soc. Lond. 1909: 132-159.